Si Hao Shen

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Citizenship: Taiwan
Date of birth: 02.01.1996

Si Hao Shen

Interests

System Design, Software Architecture, Refactoring, DevOps, Cloud/Edge Computing, Linux, System Testing, Project Management, Scrum, Test-driven development

Education

MSc. | Automation Engineering Science Okt. 2020 – Mär. 2022
RWTH University Aachen

BSc. | Mechanical Engineering Okt. 2015 – Sep. 2020
Energy Engineering RWTH University Aachen

Gymnasium | German A level Abitur Apr. 2010 – Sep. 2015
Kepler Gymnasium Freiburg

Work- & Research Experience

Software Engineer at Siemens AG Mär. 2022 - Present

- **Software Engineering Activity**:
  - Migrated existing apps on **MindSphere** Cloud to IIoT Edge Device
  - **Refactoring** a web app to increase code quality and code coverage, to reduce cyclomatic and cognitive complexity
  - Developed **Predictive Service App** for Depaneling Machines on IIoT Edge Device
  - Developed a **secure network communication** between customer and remote expert for the process industry

- **DevOps Activity**:
  - Created multiple **Gitlab CI/CD** pipelines for automated compilation, unit test, end-to-end test and deployment to target cloud & edge platform
  - Developed automated **Terraform** scripts for provisioning **AWS EKS** Cluster and **Industrial Edge Ecosystem**

- **System Test and Other Activities**:
  - Developed **Cypress** test automation suite for end-to-end test
  - Support Scrum Master to maintain on **Azure DevOps** task entries as well as test runs
  - Helped development of **Edge Developer Guide and Ecosystem Guideline**

Master thesis student at Digital Industries Siemens AG Okt. 2021 – Mär. 2022
Title: Conceptual and Realization of an architecture for the generalistic evaluation of log messages for various applications in the context of Industry 4.0

- Developed a standardized logging structure for efficient application monitoring
- Conceptual design and evaluation of different software architecture concepts for AWS
- Developed a system monitoring, data analytics and pay-per-use application using ELK Stack on AWS ECS Cluster
- Technology: AWS, Docker, Terraform, Ansible, ELK Stack
- Supervisor: MSc. Ramy Hana, Prof. Tobias Kleinert

Research Assistant at Institute of Thermodynamics of Mobile Energy Conversion Systems
Apr. 2020 – Sep. 2021

- Developed a real-time capable bus system in an Engine-in-the-Loop testbench
- Coupling of different hardware-in-the-loop test benches and heterogeneous test automation tools via ASAM XIL API
- System identification of a dynamic vehicle model using nonlinear autoregressive NARX structure
- Technology: C#/.NET, Python

Bachelor thesis student at FEV Europe GmbH Okt. 2019 – Apr. 2020
Title: Investigation and optimization of a real-time capable model for Hardware-in-the-Loop applications

- Testing Engine-in-the-Loop to investigate interactions between different components of hybrid powertrains in dynamic use
- Coupling of laboratory test benches via network based real-time communication
- Analysis of the hard real-time application and its scheduling algorithms
- Technology: dSPACE Toolchain, ControlDesk, ConfigurationDesk, INCA, Matlab
- Supervisor: MSc. Sung-Yong Lee, Prof. Jakob Andert

- **Project Engineering Intern at Robert Bosch GmbH** Oct. 2018 - Mar. 2019
  - Further software development of a reliability prediction tool for the control units in the Electronic Control Unit Research department
  - Preparation and test planning according to different test methods

Completed Projects during University Study

Distributed Process Control System for Pump

- Implementation of a pre-pumping station for waste-water treatment system
- Monitoring and control of the plant with SIMATIC PCS7

Full Stack Cloud Microservice Project

- Implementation of a backend service and dynamic frontend web page using Django
- Use of various tools with Kubernetes, MongoDB and DevOps
- Technology: IBM Cloudant Database, Serverless Cloud, Microservices

Development of a control concept for an ABB Delta Robot in Robot Operating System (ROS)

- Development of the delta robot model for ABB IRB 360 in ROS
- Implementation of a motion planning pipeline using MoveIt!

Implementation of Deep Q-Network Algorithm

- Solving CartPole reinforcement learning problem in OpenAI Gym
- Use Deep deterministic policy gradient to solve continuous action space

Seminar project on concepts, taxonomies, and applications in Explainable AI especially in human-machine interaction

- Study the state of the art in XAI
- Analyze a use case of using XAI for task scheduling of Robots

Development of a dynamic anomaly detector for vibration data using an LSTM autoencoder

- Successfully predicting the anomaly in the pump to ensure safe operation
- Identifying thresholds based on a trained LSTM autoencoder

Implementing change management in a virtual enterprise with a focus on agility

- Focus on agile and cultural differences when applying changes
- Using Jira to track agile project management

Using deep learning to create novel artwork

- Style transfer using a convolutional neural network

Skills

Languages: Chinese (native), German (bilingual proficiency), English (working proficiency), French (basic)
Programming Languages: MATLAB, Python, C#, C++, Java, UML, Modelica, Typescript
Tools:

- **Cloud & Edge Computing**: AWS, MindSphere, Industrial Edge, Terraform, Ansible
- **DevOps**: Docker, Kubernetes, Git, Linux, Bash
- **Database**: PostgreSQL, Influxdb, MongoDB, ElasticSearch
- **Automotive**: ECU-Test, INCA, dSPACE Toolchain, QNX
- **Engineering**: Siemens NX, AutoCAD, LabVIEW
- **Deep Learning und RL**: TensorFlow, Pytorch, OpenAI
- **Robotik**: ROS, MoveIt!
- **Projekt Management**: Jira, Latex, Azure DevOps, MS Office

Social Engagement

Hacking For Future Hackathon Fraunhofer IPT | Second Place Apr. 2021

Ingenieure ohne Grenzen Nepal Group Mar. 2017 - Jan. 2018

Tutor in Mechanics Course at RWTH Mar. 2015 – Mar. 2016

- Leading a practice group of 20 students
- Weekly practice sessions for the students of the course and support